



# ZERO BEAT



AMSAT



## Hampden County Radio Association

Springfield, MA

January 1986

ARRL Affiliated, 37th Year

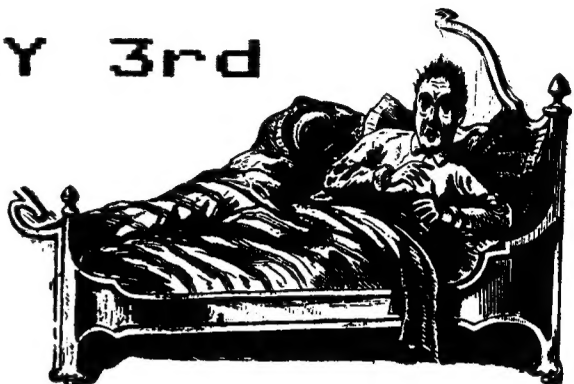
### Next Meeting

FRIDAY JANUARY 3rd

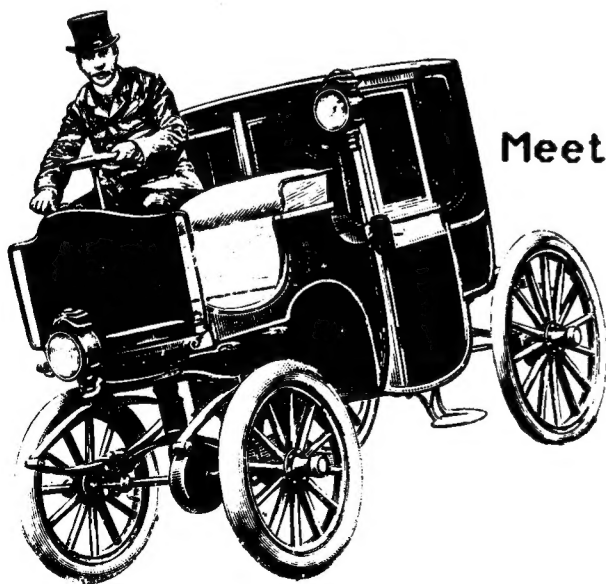
## VHF & REPEATERS

Also...

### Home Brew Nite



Bring in those projects you've been building and show them off! Rigs, amps, computer interfaces, and what have you?



Feeding Hills Cong. Church  
Center of Feeding Hills  
Routes 57 and 187  
Doors open at 7:30 PM  
Meeting starts promptly at 8:00 PM

Please, no smoking during  
the meeting! Thank you!



NO SMOKING

CONGRATULATIONS TO OUR  
NEWEST NOVICES:  
Elaine Brown Gary Moskal  
Howard Plouf

Congratulations to all who  
upgraded December 14th! See  
February issue for an article.

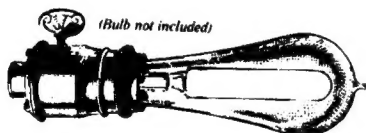
Dues are \$9.00 per season, September thru June. Please mail to: NIAEH,  
Greg Stoddard, 1500 Mapleton Avenue, Suffield, CT 06078. Thank you!

# JANUARY VHF SWEEPSTAKES

It's that time of year again! VHF Sweepstakes are upon us! Hams all over the U.S. will be competing for awards on the VHF and higher bands. The HCRA has taken third place for the past two years. To do better this year we need everybody's help. There is NO SCORE too small, we need YOU!

High scores are very possible because almost everyone now has a synthesized radio. Getting on more than one band is also possible, because so many have a 440 or 220 rig! That's how the club score can be doubled in 1986! By using 2 meters and one or more other bands, the multipliers really add up quick. Members limited to FM and low power will be amazed at how far they can get on direct. The use of 146.52 simplex is not allowed, but all other simplex frequencies are ok. Other radio clubs in the area will be in this contest, so there should be a lot of people to talk to. If you only have two meter FM, use 146.55, 146.58, 146.49 just to avoid some of the congestion!

All that is needed for an exchange is a your grid square, most of us are FN32. A typical exchange might go like this: "KALMPA, this is NB1R, FN32" and Bob would then reply, "QSL and you're also FN32." A log sheet and entry form are provided in this issue of Zero Beat.



**VHF SWEEPSTAKES**

**CONTEST STARTS:**

**1900 UTC**

**SATURDAY JAN 11TH**

**CONTEST ENDS:**

**0400 UTC**

**MONDAY JAN 13TH**

**EXCHANGE: FN32  
OR GRID SQUARES**

**GET ON MORE THAN  
ONE BAND!!!**

Look for multipliers to boost your score. W1VD and K1WVX will be on from FN31. (Most of Connecticut) The more bands you can work the more multipliers you can rack up! Don't miss working the club station, W1NY.

Extra log sheets, etc. will be available at the January HCRA meeting.

FN 23	FN 33	VT		FN 33	FN 43
FN 22				FN 32	FN 42
	Albany				
NY					MASS
		Pittsfield	Greenfield		Worcester
			Northampton		
FN 22	FN 32	Westfield	Springfield	FN 42	
FN 21	FN 31	CT		FN 31	FN 41
					RI

# JANUARY VHF SWEEPSTAKES

## DON'T LET US CRASH

Here we go again! Into the competition maelstrom of the VHF Sweepstakes! We missed out on beating our rivals by only 40,000 points in 1985. You don't want that to happen this year!

Your score should go up this contest- ARRL has changed how the scoring is done and totally changed how this contest works. This is a blessing in disguise. Most club efforts will fall by the wayside due to this big difference in how-works-the-contest. You'll be exchanging a grid identifier instead of section this year- for most of us in Western Mass., the ID to use is FN32. No RST, no section, just that grid ID and your call! Simple and effective! And you'll be able to earn several awards- VUCC and maybe a special certificate from the club!

So, for every contest contact, it will go like this: "W1VNE, this is W1YYK, Fox-November-Three-2, QSL? And in this case you'd get back an FN32 from W1VNE. This year every different grid ID counts as a multiplier for your score, and on every band you work, each one can be re-counted. It'll be great to work the same grids on different bands, and use the multipliers so many more times. Logs and scoring sheets are included in this issue. Return them to ARRL after the contest.

Read the rules in December QST,

Use of 146.52 is not allowed, but many other simplex frequencies are ok. Just to avoid congestion, use 146.49, 146.55 and 146.58 simplex if you're limited only to FM on two meters. That's where we'll all look for you. If you can't get on for a lot of time, use these suggested times to operate:

2 to 3 p.m.	6:30 to 8:00 p.m.
(Sat. & Sun.)	(Sat. & Sun.)

9:00 to 10:00 a.m. (Sunday)  
All are in local times.

## VHF SWEEPSTAKES

IF YOU'RE NEW TO  
THIS CONTEST, TRY  
THESE FREQUENCIES:  
50.1 CW 50.110 USB  
52.525 FM

144.01 USB  
146.49, .55, .58 FM

223.5 FM

432.1 USB 446.0 FM



\*Special badges were given out in 1985 to everyone who sent a log in for the club score!

# JANUARY VHF SWEEPSTAKES

## VHF SWEEPSTAKES PROPAGATION

These people are desperate! The contest is winding down and they haven't made 1 million points! You're the man of the hour! (Ham-of-the-hour?) With your ten watt rig feeding a coat hanger on the kitchen table, you can work all those distant stations. How, might you ask? Desperate times call for desperate measures- they'll strain their ears to pull your signal out of the muck! How far can your signals really go?

This depends on various factors. Single sideband, CW, and FM signals propagate in many different ways on VHF/UHF bands. When you see a weather map in the morning paper, check to see if a warm air mass is overrunning a cold air mass. Then you can expect tropospheric bending of your signal, which will come down who knows where! This weather inversion causes DX to open to incredible distances. Aim your antenna along the trailing edge and expect to hear stations in a wide coverage area.

Sporadic E skip occurs when intense patches of ionization occur. Solar flares produce these and can be very strong. Listen to WIAW and WWV for the solar index or news of a solar flare. Or if you start to hear stations in California on two meters, suspect Sporadic E! F layer openings can also be spectacular, and maybe one will appear during the contest.

If Donald Duck suddenly seems to be working you on SSB, or the CW has a strange fluttery sound, you're most likely bouncing your signals off an aurora. Look out the window for the Northern lights, or Aurora Borealis! You don't need to be a high power, super-station like WIKK to work Washington State from Massachusetts! Once you hear auroral propagation, you won't forget it. Try pointing those antennas North at night!

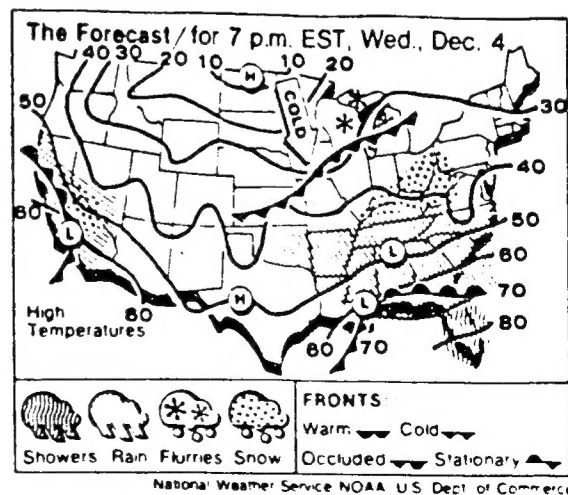
Transequatorial propagation occurs along the North/South line of the sun. You can work South American stations on six meters! Tropospheric scatter on two meter CW can go over 500 miles. Signals tend to be weak and fluttery, but what some people won't do for a multiplier! Meteor scatter is beyond the

ken of most of us, but some of the club's operators will be using it. EME, or bouncing signals off the moon will be used even more. WINY hopes to establish a new club record!



### \*WB1DLH LOOKING FOR A BAND OPENING!!\*

Beam antennas work best, but you shouldn't stay out of the contest because you feel you have a "poor" station. Every year many hams rack up over 1,000 points using a rubber duck, 1 watt, and simplex FM frequencies! Keep in mind they want you, and you're doing them a favor! The "them's" have high-priced gear, and antenna farms, so get on and work 'em!



\*The weather map in the morning paper is a great source of information on possible band openings!\*

# Balloon-carried transponders relay ground-based signals

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by Julian Macassey, N6ARE\*

**D**uring the 1970s in Europe, there were many VHF/UHF transponders of the Mode B type launched from balloons. Most of those were launched by the Germans and had the acronym ARTOB, for Amateur Radio Transponder On Balloon. The French and Italian amateur communities have also launched these devices. ARTOBs were usually launched early on Sunday mornings and reached a good workable height by breakfast time, providing an excellent excuse not to do the gardening.

In the 1980s, it is worth taking another look at ARTOBs, even though we will shortly have polar orbiting satellites carrying packet store-and-forward capabilities as well as high-orbit satellites capable of covering half the world and providing superb DX. At first glance proposing a short term transponder lashing about in the jet stream 70 thousand feet up seems a retrograde step. However, there are several important advantages.

The first is that a balloon-launched transponder is inexpensive to both build and launch. Normally, the only governmental agency that must be notified for clearance is the local air ministry, such as the FAA in the US. Because scientific and meteorological balloons are being launched daily, registration is usually a simple formality.

The simplest ARTOB is a balloon-supported digipeater. Recent experience on the west coast of the U.S. has shown that packet radio is ideally suited for emergency traffic. It handles large amounts of data flawlessly. The Achilles heel of such a system is that it works well locally but bogs down when hitting the CW National Traffic System which handles traffic at a much slower rate.

The equipment for such a set up for a flying digipeater could consist of an ICOM IC-22A, a TAPR TNC2 terminal node controller, two 12-V gel cells, one antenna, one radar reflector, one or more helium-filled balloons, one decent parachute, one ID beacon, and styrofoam for insulation.

Some of the parts, such as the battery and radar reflector, are common to any ARTOB. The transponder hardware is what would change and depending on the complexity of the transponder, the costs would change. For example, the ICOM IC-22A digipeater would cost no more than \$300, assuming the 2-meter FM rig is purchased for the project and not donated from the rear of someone's garage.

The ARTOB hardware must withstand the cold of high altitudes and the impact of a parachute landing. Most currently available commercial or home-built equipment, with enough padding and styrofoam, could withstand such a flight. Such is not the case for space hardware, which has to withstand a vacuum, continued radiation, extreme vibration, and wild swings in temperature, all while performing flawlessly for years.

If an ARTOB fails in flight, it is merely minor disappointment. In a few hours it will be back on earth for repairs and battery recharging. At the extreme, any problems observed while a balloon-launched ARTOB is in flight can be corrected before the next launch. An ARTOB, essentially, is a flying test bed.

The launch requires a charge of helium and, of course, a charge in the batteries. Although helium is not the cheapest of gases, the quantity required for a launch could be paid for with the simple pass of the hat. The sort of quantity that is normally used to fill the balloons at a child's birthday party is all that is required for an ARTOB, and the clown is optional.

## A real-time test

AMSAT is constantly considering and trying out new ideas in transponders and antennas. Building hardware to test in the laboratory does give some useful numbers, but putting that same hardware in a balloon-launched vehicle is an excellent field test with the bonus of hundreds of users who can file test reports to supplement the in-flight telemetry and the observations of the designers. In addition, aside from free space itself, the upper atmosphere is the next best thing for antenna testing.

Sending hundreds or thousands of dollars worth of equipment up into the sky requires either deep pockets or a means of recovering the transponder. In addition, thought must be given to precisely where the transponder returns to earth. If the ARTOB comes down in open country there might be little damage to property but the ARTOB might be difficult to reach. However, in a built-up area property owners might not be happy to know a balloon has just landed on their roof. Indeed, it is hard to wander about a suburban neighborhood trying not to look suspicious.

For purposes of retrieval, each ARTOB can carry an ID beacon on a known frequency. The beacon could also carry telemetry. A recovery team made up of avid direction-finders, or fox hunters could maintain bearings on the ARTOB and track the descent. Then field teams could take over for ground recovery. That would add a new dimension to fox hunts since the target would be moving. The final resting point could be anywhere in a several hundred kilometer radius. Special certificates could be awarded to the successful recovery team or individual. Civil Air Patrol types might also be interested in locating a downed ARTOB since it would closely model a downed aircraft with an emergency locator transmitter (ELT). As with regular transmitter hunts, there could be awards and certificates to the successful location and recovery teams.

Besides the usual weather radiosonde data that could be gathered by an ARTOB for use by a weather bureau, any group or individual interested in upper atmosphere measurements could hitch a ride to use AMSAT expertise in the collection of data by telemetry. With all the current excitement about acid rain, the greenhouse effect, and upper atmospheric dust and smoke, there might be many groups interested in taking measurements from a balloon.

## AMSAT benefits

For AMSAT, there are times when a new transponder design might need testing. For example, an improved AGC system might need checking, and the only way to check it out dynamically is with hundreds of signals of different levels pouring through it. AMSAT could fly a breadboard prototype before continuing with the expensive work of preparing space flight hardware. The same can be said of most of the parts of an increasingly more complex modern amateur satellite.

Every field day, hundreds of amateurs find out about the amateur space program by wandering past the OSCAR tent. There a lonely ham sits at a card table covered with strange boxes. A couple of funny looking antennas, stuck on a short pole outside the tent, points up at an acute angle. The passerby discovers that this is the OSCAR field day effort and that the group has just worked six new countries even though 20 meters has been closed for hours.

Each field day or other large contest, AMSAT could launch an ARTOB to enable more contacts and gain further publicity and good will for the organization and the amateur satellite program. With the cooperation of the contest organizer, there could be extra points awarded for working via the ARTOB.

By launching ARTOBs, the coverage of an area can be greatly extended. The ARTOB could be of varying levels of sophistication, the lowest level being a single simplex-channel FM digipeater. The next would be a single-channel FM store-and-forward device, a flying bulletin-board system. The top-of-the-line model could be a multi-channel transponder enabling several stations to work at high speed, with different channels set aside for various classes of traffic.


Experience will help develop a set of standards for reliable ARTOB operation, such as battery types, balloon specifications, etc., although the whole purpose of the program is experimentation. If no two ARTOBs are ever the same, there can still be great benefits in what can be learned from the efforts. If a group decides to get into building space hardware, the best entry point is to build an ARTOB and learn the engineering problems.

The ARTOB program is in no way intended to replace any existing programs. The main role for AMSAT could be to provide assistance, liaison, and coordination. Any group building balloon-launched equipment could use AMSAT for help if they wish and AMSAT could act as the clearing house. Any group would be well advised to contact AMSAT first since they would have information available on the activities of other groups and be able to describe previously-encountered problems and their solution.

There could be an ARTOB manager within AMSAT who would have the task of knowing everyone and everything to do with balloons and what is being hung from them. He would also handle launch publicity on a national and international basis.

If you have experience or information about similar devices or programs, or if you would like to get started on an ARTOB program, please contact the author.

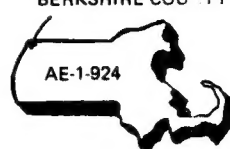
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"A LAUGH AND A HALF"

BERKSHIRE COUNTY




AE-1-924

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FOR SALE: KENWOOD TS520SE HF TRANSCEIVER, 250/500HZ FILTER, DG5 FREQUENCY METER, MANUAL, SERVICE MANUAL, ORIGINAL BOXES, \$450.00 ARCHIE, 413-536-4578

## RG-8A Coaxial Cable Sale

A limited amount of this high-quality foam-core RG-8A coax is now on sale. Some local stores have been selling poor-grade cable for 37¢ per foot! Our coax is brand new, with 96% shielding. Here's your chance to save some money and get better performance.

Price: 500 foot roll, 18¢ per foot

100 foot lengths, 22¢ per foot

We'll bring your cable to the next HCRA meeting. You can order over the phone, but there is only a limited amount, and prepaid orders will be taken care of first. odd lengths, 27¢ per foot

Mail to: Jeffrey J. Duquette, K1BE  
P O Box 346  
Southwick, MA 01077  
Phone: Day 413-730-3253

Make checks payable  
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Evenings (Before 9 pm!) 413-569-6739

Loss in db per 100 feet

TYPE	IMPEDENCE	3.5 Mhz	7 Mhz	14 Mhz	21	28	50	144 Mhz
RG 8/U	52 ohms	0.3	0.45	0.66	0.83	0.98	1.35	2.5
RG 8 A/U	"	0.25	0.36	0.53	0.67	0.80	1.1	2.0

Velocity factor of the RG 8 A/U is .81

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## log sheet \_\_\_\_ of \_\_\_\_

## Hampden County Radio Association

CALL USED \_\_\_\_\_

APRIL SECTION  
or COUNTRY \_\_\_\_\_

50 QSOs per side  
Number each new multiplier as worked

CD - 241 (R678)



# JANUARY VHF SWEEPSTAKES

## PAST PERFORMANCES IN THE VHF SWEEPSTAKES!

This small club out in the boonies of Western Mass has done well in the January VHF Sweepstakes since it began! The table gives you some of the club's scores going back to 1957. We don't have access to an older collection of QST's, so can't give you the scores going way back. (If you have older issues, how about checking our scores?) We took the number 1 spot in the nation two years in a row, 1982, and 1983. Perhaps if we'd taken the gold again in 1984 we'd be willing to rest on our laurels! The 1982 total of 282,094 points remains the club's all time high score. Will we ever top it?

Like all club activities, interest waxes and wanes, but this contest still seems to stir the juices! No super station is required, and every club member can play an important part. Modest handi-talkies can rack up enough points to put us over the top. Most now have rigs that operate on other VHF bands besides two meters, and that's just what the club needs to double and triple its' score.

The HCRA wants new people to try out this contest. You can operate from a group station and go home to run your own station, too. (You can't work the group you were with, though.) Even a few hours will boost the club score so that we can take home the gold in 1986!

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1976	42,771	8TH
1977	31,570	8TH
1978	13,358	15TH

### NEW SCORING SYSTEM

1979	93,570	5TH
1980	142,566	3RD
1981	213,746	2ND
*1982	282,094	FIRST*
*1983	280,576	FIRST*
1984	132,969	3RD
1985	192,556	3RD



## VHF SWEEPSTAKES

**TRY TO GET  
MULTIPLIERS!**

**YOU CAN WORK A  
STATION ONCE ON  
EVERY BAND!**

**WORK AS MANY  
BANDS AS YOU CAN  
AND RAISE YOUR  
SCORE!!!**

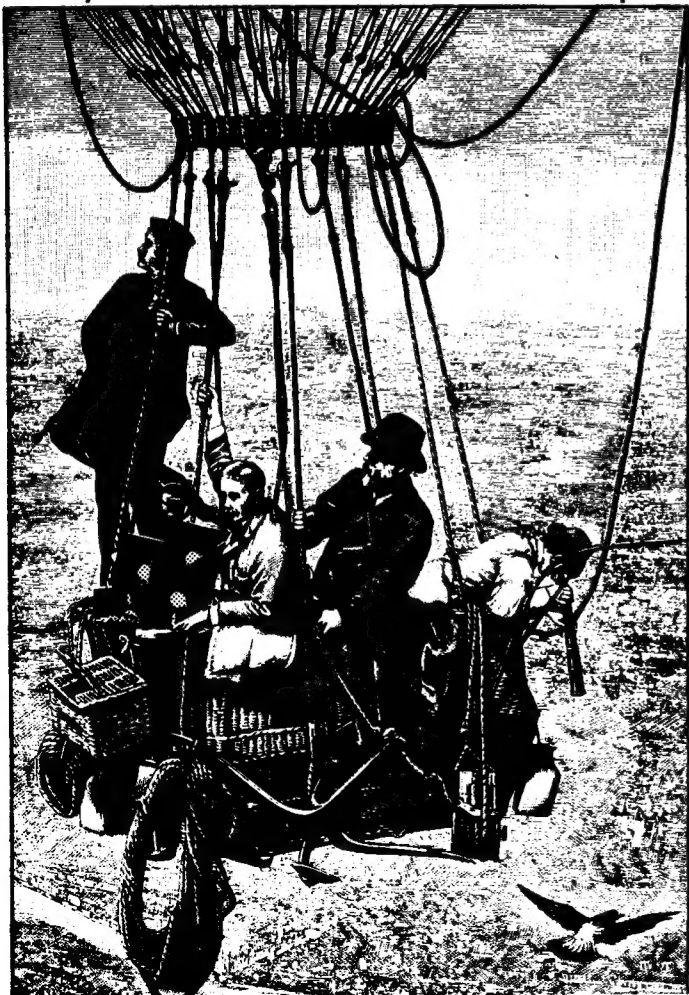
### PAST VHF SS SCORES:

Year	Score	Place
1957	45,015	4TH
1958	195,501	3RD
1959	76,941	6TH
1960	33,917	15TH
1961	19,841	24TH
1962	33,564	14TH
1963	20,252	28TH
1964	DID NOT ENTER!	
1965	37,760	14TH
1966	47,730	9TH
1967	58,841	9TH
1968	42,796	6TH
1969	67,994	6TH
1970	105,736	5TH
1971	123,898	4TH
1972	57,336	8TH
1973		
1974	16,838	9TH
1975	35,394	7TH

# CALENDAR OF EVENTS

## 1985 - 1986 HCRA Meeting Schedule

Friday	03-Jan-86	VHF & Repeaters
Friday	07-Feb-86	Computers in TV
Friday	07-Mar-86	HF propagation
Friday	04-Apr-86	Special speaker
<u>Sunday</u>	04-May-86	Annual Flea Market
Friday	06-Jun-86	Annual June Banquet



**Hampden County  
Radio Association**

P.O. Box 482  
West Springfield, MA 01090



ACIT EY 10/86

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